

LISTING OF THE CLAIMS:

1. (Currently amended) An optical switching equipment for switching a route of an optical signal received from any one of a plurality of optical transmission routes and outputting said optical signal to any one of a plurality of optical transmission routes, comprising:

first interfaces for transmitting or receiving optical signals to or from ~~another~~ other optical switching equipment through a plurality of first optical transmission routes;

second interfaces for transmitting or receiving optical signals to or from a communicating equipment connected to said optical switching equipment through a plurality of second optical transmission routes;

at least one optical switch for providing ~~a route~~ routes of ~~each of said~~ optical signals between ~~said first interfaces or between one of said first interfaces and one of said second~~ interfaces; and

a control circuit for setting the route of ~~each~~ the optical ~~signal~~ signals inside said at least one optical switch; wherein:

each of said second interfaces ~~at an optical signal receiving side~~ includes means for splitting ~~an optical~~ a signal received from a second optical transmission route into a plurality of optical signals for output to said optical switch, and means for selecting one of a plurality of optical signals received from said optical switch for output as a selected signal to a second optical transmission route,

~~said control circuit controls said optical switch to assign different routes to the split optical signals so as to output the split optical signals to different first optical transmission routes, respectively, and~~

~~each of said second interfaces at an optical signal transmission side includes means for receiving plural optical signals from different first optical transmission routes via the optical~~

~~switch and selecting one optical signal to output to a respective second optical transmission route~~

said control circuit sets a route between first interfaces in said at least one optical switch,
and

said control circuit sets in said at least one optical switch at least one of:

(a) routes outputting the plurality of optical signals split at one of said
second interfaces to different first optical transmission routes, and

(b) routes leading optical signals from different first optical transmission
routes, having been split from an optical signal at a second interface of another
optical switching equipment, to one of said selecting and outputting means in a
second interface in said optical switching equipment.

2. (Currently amended) An optical switching equipment for switching a route of an optical signal received from any one of a plurality of optical transmission routes and outputting said signal to any one of a plurality of optical transmission routes, comprising:

a plurality of optical receivers for receiving optical signals from a plurality of first optical transmission routes;

a plurality of optical distributors for receiving optical signals from a plurality of second optical transmission routes and distributing received signals as a plurality of optical signals;

at least one ~~switch~~ optical switch provided with a plurality of input and output terminals respectively and for switchably outputting any of the optical signals received from said optical receivers and said optical distributors at any one of said plurality of input terminals to any one of said plurality of output terminals;

a plurality of optical transmitters for outputting the optical signals from first output terminals of said at least one optical switch to the first optical transmission routes corresponding to said first output terminals;

a plurality of optical selectors, each for receiving a plurality of optical signals from second output terminals of said at least one optical switch, selecting any one of the optical signals from the second output terminals, and outputting said selected signal to the second optical transmission route corresponding to said second output terminals; and

a control circuit for setting each route of an optical signal in said optical switch; wherein:

~~wherein each optical signal received from a second optical transmission route is split into a plurality of optical signals through the effect of one of said optical distributors and said plurality of optical signals are outputted to corresponding first different optical transmission routes through a plurality of routes set in said optical switch, and~~

~~as to the optical signal to be outputted to one second optical transmission route, when a plurality of routes are set to said optical switch and a plurality of optical signals are received from said plurality of first different optical transmission routes, the optical selector for the one second transmission route selects one of said plurality of optical signals and then outputs it to said one second optical transmission route~~

said control circuit sets a route in the at least one optical switch leading an optical signal from one said optical receivers to one of said optical transmitters, and

said control circuit sets in said optical switch at least one of:

(a) routes outputting the plurality of optical signals split at one of said optical distributors to different optical transmitters; and

(b) routes leading optical signals transmitted on different first optical transmission routes, having been split from an optical signal at an optical distributor of another optical switching equipment, to one of said optical selectors in said optical switching equipment.

3. (Currently amended) An optical switching equipment as claimed in claim 1, wherein when ~~[[the]]~~ an output destination of ~~[[the]]~~ an optical signal received from any one of said plurality of first transmission routes corresponds to any one of said plurality of first optical transmission routes, the control sets a route through the at least one optical switch to the first interface corresponding to the destination first optical transmission route ~~where said optical signal is to be outputted is set to said at least one optical switch~~ and the received optical signal is outputted thereto.

4. (Currently amended) An optical switching equipment as claimed in claim 2, wherein when ~~[[the]]~~ an output destination of ~~[[the]]~~ an optical signal received from any one of said plurality of first transmission routes corresponds to any one of said plurality of first optical transmission routes, the control sets a route through the at least one optical switch to the optical transmitter corresponding to the destination first optical transmission route ~~where said optical signal is to be outputted is set to said at least one optical switch~~ and the received optical signal is outputted thereto.

5. (Previously presented) An optical switching equipment as claimed in claim 1, wherein said at least one optical switch comprises a plurality of optical switches and the optical

signal received from a respective second optical transmission route and the optical signal to be outputted to said respective second optical transmission route are routed to different optical switches so as to output the split optical signals to the first different optical transmission routes and receive optical signals from the first different optical transmission routes.

6. (Previously presented) An optical switching equipment as claimed in claim 2, wherein said at least one optical switch comprises a plurality of optical switches, and the optical signal received from a respective second optical transmission route and the optical signal to be outputted to said second optical transmission route are routed to the different optical switches so as to output the split optical signals to the first different optical transmission routes and receive optical signals from the first different optical transmission routes.

7. (Original) An optical switching equipment as claimed in claim 5, wherein when the output destination of the optical signal received from any one of said plurality of first transmission routes corresponds to any one of said plurality of first optical transmission routes, the route corresponding to the first optical transmission route where said optical signal is to be outputted is set to any one of said optical switches and said optical signal is outputted thereto.

8. (Original) An optical switching equipment as claimed in claim 6, wherein when the output destination of the optical signal received from any one of said plurality of first transmission routes corresponds to any one of said plurality of first optical transmission routes, the route corresponding to the first optical transmission route where said optical signal is to be outputted is set to any one of said optical switches and said optical signal is outputted thereto.

9. (Previously presented) A method of using an optical switching equipment for switching a route of an optical signal received from any one of a plurality of first optical transmission routes and second optical transmission routes and outputting the optical signal to any one of a plurality of third optical transmission routes, and a plurality of fourth optical transmission routes, comprising the steps of:

switching the routes of at least two optical signals respectively received from different first optical transmission routes for one of said fourth optical transmission routes;

selecting one of said at least two optical signals for which routes have been switched for said one of said fourth optical transmission routes;

outputting the selected one optical signal to said one of said fourth optical transmission routes;

splitting an optical signal received from any one of said second optical transmission routes into at least two optical signals;

switching the routes of the at least two split optical signals for different third optical transmission routes, respectively; and

outputting the at least two split optical signals for which routes have been switched to said different third optical transmission routes.

Claims 10-11 (Cancelled)

12. (Currently amended) An optical transport network comprising a plurality of optical switching equipments connected with a plurality of first optical transmission routes and

for transmitting or receiving optical signals between said optical switching equipments, each of said optical switching equipments comprising:

first interfaces for transmitting or receiving optical signals to or from another optical switching equipment through a plurality of first optical transmission routes,

second interfaces for transmitting or receiving optical signals to or from a communicating equipment connected with said optical switching equipment through a plurality of second optical transmission routes,

at least one optical switch for providing ~~a route~~ routes of ~~each of said~~ optical signals between ~~said first interfaces or between one of said first interfaces and one of said second~~ interfaces; and

a control circuit for setting the routes of the optical signals inside said at least one optical switch; wherein:

in the case of adding an optical signal received from a second optical transmission route into said optical transport network, said received optical signal is split into a plurality of optical signals at one of said second interfaces, and the respective split optical signals are transmitted to different optical switching equipments via the different routes in said at least one optical switch and different first optical transmission routes respectively connected to the different switch routes,

in the case of dropping an optical signal received from said optical transport network to a second optical transmission route, different routes in said optical switch are set for a plurality of optical signals received from different optical switching equipments via different first optical transmission routes to one of said second interfaces, and said one of said second interfaces selects one optical signal to ~~output~~ output, and

in the case of relaying an optical signal inside said optical transport network, an optical signal received from one of said plurality of first transmission routes is output to a destination first optical transmission route through a route set in said optical switch.

Claims 13-15 (Cancelled)

16. (Currently amended) An optical switching equipment for switching the route of an optical signal received from any one of a plurality of optical transmission routes and then outputting said optical signal to any one of a plurality of optical transmission routes, comprising:

a plurality of optical receivers for receiving wavelength-multiplexed optical signals from a plurality of first optical transmission routes;

a plurality of optical demultiplexers for demultiplexing said wavelength-multiplexed optical signals into respective frequency signals;

a plurality of first optical signal adjusters for converting the frequency of and adjusting the level of optical signals outputted from said optical demultiplexers;

a plurality of optical distributors for receiving optical signals from a plurality of second optical transmission routes and distributing each optical signal received from a second optical transmission route as a plurality of optical signals;

at least one optical switch provided with a plurality of input and output terminals respectively and for switching any one of the optical signals from said optical signal adjusters and from said optical distributors received at any one of said input terminals to any one of said output terminals;

a plurality of second optical signal adjusters for converting the frequency and adjusting the level of the optical signals outputted from said at least one optical switch;

a plurality of optical multiplexers for multiplexing the outputs of a plurality of the second optical signal adjusters into wavelength-multiplexed optical signals;

a plurality of optical transmitters for outputting the wavelength-multiplexed optical signals from said optical multiplexers to the first optical transmission routes;

a plurality of optical selectors, each for receiving a plurality of optical signals from the outputs of a plurality of second optical signal adjusters, selecting an optical signal, and outputting said selected optical signal to a respective second optical transmission route; and

a control circuit for setting the routes of the optical signals in said at least one optical switch; wherein:

said control circuit sets a route leading the optical signal from one of said first optical signal adjusters to one of said second optical signal adjusters in said at least one optical switch,
and

said control circuit sets in said at least one optical switch at least one of:

(a) routes outputting the plurality of optical signals split at one of said optical distributors to second optical signal adjusters connected with different optical multiplexers; and

(b) routes leading the optical signals from different first optical transmission routes, the optical signals having been split from an optical signal at an optical distributor of another optical switching equipment, to one of said optical selectors in said optical switching equipment.

17. (New) The method of claim 9, further comprising:

switching the route of at least one optical signal received from one of the different first optical transmission routes for one of said different third optical transmission routes; and

outputting the at least one optical signal for which the route have been switched to said one of the different third optical transmission routes together with one of the split optical signals.